

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A process for extract purification of sugar beet raw juice, comprising:

a) preliming sugar beet raw juice by adding milk of lime thereto until a concentration of about 0.1 to 0.3 g of CaO/100 ml of raw juice has been attained for at least one of precipitation and coagulation of non-sucrose substances in the form of a coagulate,

b) adding at least one copolymer of acrylamide and sodium acrylate having a molar mass of about 5 million to about 22 million as a polyanionic ~~flocculant~~ up to flocculation assistant in a concentration of 1 to 8 ppm,

c) removing coagulate from the preliming juice using at least one first removal apparatus to obtain a clear preliming juice,

d) main liming the preliming juice obtained after removal of the coagulate by adding milk of lime until a concentration of about 0.6 g of CaO/100 ml in the clear preliming juice has been attained, and

e) performing a first carbonatation by introducing carbon dioxide into the main liming juice followed by an optional subsequent performance of a second carbonatation.

2. (Previously Presented) The process according to claim 1, wherein 1 to 3 ppm of flocculant are added.

3. (Previously Presented) The process according to claim 1, wherein the first removal apparatus is a static or dynamic decanter.

4. (Previously Presented) The process according to claim 1, wherein the first removal apparatus used is a centrifuge.

5. (Previously Presented) The process according to claim 4, wherein the centrifuge is a pan centrifuge or decanter centrifuge.

6. (Previously Presented) The process according to claim 1, wherein the removed coagulate is concentrated further using a second removal apparatus by removing a further clear preliming juice.

7. (Previously Presented) The process according to claim 6, wherein the second removal apparatus used is at least one membrane filter press.

8. (Previously Presented) The process according to claim 6, wherein the second removal apparatus used is one or more of at least one of decanter centrifuge(s), pan separators and vacuum rotary filters.

9. (Currently Amended) The process according to claim 1, further comprising concentrating the coagulate removed from the preliming step in step (c) to obtain wherein a concentrated coagulate having a dry substance content of 40% to 70% ~~is obtained~~.

10. (Previously Presented) The process according to claim 6, wherein the clear preliming juices obtained using the first and second removal apparatus are combined and subjected to a main liming.

Claim 11 (Canceled).

12. (Currently Amended) The process according to claim 1 ~~[[11]]~~, wherein the pH of the main liming juice is lowered stepwise to from 10.6 to 11.4 by adding carbon dioxide.

13. (Currently Amended) The process according to claim 1 [[11]], wherein the first carbonated juice is filtered by means of a candle filter to obtain a first carbonated juice concentrate and a first clear carbonatation juice.

14. (Previously Presented) The process according to claim 13, wherein a portion of the first carbonated juice concentrate is used for preliming the beet raw juice.

15. (Previously Presented) The process according to claim 13, wherein the first clear carbonatation juice is subjected to a second carbonatation by adding carbon dioxide to obtain a second carbonated juice.

16. (Previously Presented) The process according to claim 15, wherein the second carbonated juice is concentrated by removing a second clear carbonatation juice by means of a filter separator to obtain a second carbonated juice concentrate.

17. (Previously Presented) The process according to claim 16, wherein the first and second carbonated juice concentrate are combined and concentrated further by a membrane filter press to obtain a carboline.

18. (Previously Presented) A process for reducing lime consumption in extract purification of sugar beet raw juice, comprising:

a) preliming sugar beet raw juice by adding milk of lime thereto up to about 0.1 to 0.3 g of CaO/100 ml of raw juice for precipitation or coagulation of non-sucrose substances in the form of a coagulate,

b) adding at least one copolymer of acrylamide and sodium acrylate having a molar mass of about 5 million to about 22 million as a polyanionic flocculant up to a concentration of 1 to 8 ppm,

c) removing the coagulate from the preliming juice using at least one first removal apparatus to obtain a clear preliming juice,

- d) main liming preliming juice obtained after removal of the coagulate by adding milk of lime up to about 0.6 g of CaO/100 ml to the clear preliming juice, and
- e) performing a first carbonatation by introducing carbon dioxide into the main liming juice and subsequently performing a second carbonatation without intermediate postliming.

19. (Previously Presented) The process according to claim 18, wherein 1 to 3 ppm of flocculant are added and the first removal apparatus is a static decanter.

20. (Previously Presented) The process according to claim 18, wherein 1 to 8 ppm of flocculant are added and the first removal apparatus is a pan centrifuge or decanter centrifuge.

21. (Previously Presented) The process according to claim 18, wherein the coagulate removed is concentrated further using a second removal apparatus by removing a further clear preliming juice.

22. (Previously Presented) The process according to claim 21, wherein the second removal apparatus comprises one or more of at least one of decanter centrifuge(s), pan separators, vacuum rotary filters and membrane filter press(es).

23. (Previously Presented) The process according to claim 21, wherein clear preliming juices obtained using the first and second removal apparatus are combined and subjected to a main liming.

Claim 24 (Canceled).

25. (Currently Amended) The process according to claim 18 ~~[[24]]~~, wherein the first carbonated juice is filtered by a candle filter to obtain a first carbonated juice concentrate and a clear carbonatation juice.

26. (Previously Presented) The process according to claim 25, wherein the first clear carbonatation juice is subjected to a second carbonatation by adding carbon dioxide thereto to obtain a second carbonated juice.

27. (Previously Presented) A process for producing a nutrient-rich non-sucrose substance concentrate from sugar beet raw juice, comprising:

- a) preliming sugar beet raw juice by adding milk of lime up to about 0.1 to 0.3 g of CaO/100 ml of raw juice for precipitation or coagulation of non-sucrose substances present in the raw juice in the form of a coagulate,
- b) adding at least one copolymer of acrylamide and sodium acrylate having a molar mass of about 5 million to about 22 million as a polyanionic flocculant in the prelimed raw juice up to a concentration of 1 to 8 ppm, and
- c) removing the coagulate from the preliming juice using at least one first removal apparatus.

28. (Currently Amended) The process according to claim 27, wherein the non-sucrose substances present in the raw juice are (a) high molecular weight protein substances, (b) polysaccharides and (c) cell wall constituents, and also (d) low molecular weight organic or inorganic acids, (e) amino acids and (f) mineral substances.

29. (Previously Presented) The process according to claim 28, wherein the cell wall constituents are selected from the group consisting of pectin substances, lignin, cellulose and hemicellulose.

30. (Previously Presented) The process according to claim 28, wherein the polysaccharides are levan and dextran.

31. (Previously Presented) The process according to claim 28, wherein the protein substances are selected from the group consisting of proteins, nucleoproteins and betaine.

32. (Previously Presented) The process according to claim 28, wherein 1 to 3 ppm of flocculant are added.

33. (Previously Presented) The process according to claim 32, wherein the first removal apparatus is a static or dynamic decanter.

34. (Previously Presented) The process according to claim 27, wherein the first removal apparatus is a pan centrifuge or a decanter centrifuge.

35. (Previously Presented) The process according to claim 27, wherein the removed coagulate is concentrated further using a second removal apparatus.

36. (Previously Presented) The process according to claim 35, wherein the second removal apparatus comprises one or more of at least one of decanter centrifuge(s), pan separator(s), vacuum rotary filters and membrane filter press(es).

37. (Currently Amended) The process according to claim 35 [[27]], wherein a concentrated coagulate with a dry substance content of 40% to 70% is obtained.

38. (Previously Presented) The process according to claim 37, wherein the concentrated coagulate is comminuted and dried.

39. (Previously Presented) A non-sucrose substance concentrate, comprising a dewatered coagulate of non-sucrose substances made from sugar beet raw juice, obtained using a process according to claim 1 by preliming the raw juice with addition of milk of lime and a flocculant for precipitation or coagulation of non-sucrose substances and removal of the separated or coagulated non-sucrose substances from the raw juice.

40. (Currently Amended) The non-sucrose substance concentrate according to claim 39, wherein the non-sucrose substances are (a) high molecular weight protein substances, (b) polysaccharides and (c) cell wall constituents, and also (d) low molecular weight organic or inorganic acids, (e) amino acids and (f) mineral substances.

41. (Previously Presented) The non-sucrose substance concentrate according to claim 39, wherein the concentrate has a high phosphorus content.

42. (Previously Presented) A method of making a phosphate fertilizer or a soil improver which comprises including therein a non-sucrose substance concentrate according to claim 39.

43. (Previously Presented) A method of making an animal feed comprising including in said feed a non-sucrose substance concentrate according to claim 39.

44. (Previously Presented) The method according to claim 43, wherein the non-sucrose substance concentrate is comminuted, mixed with molasses and dried.

45. (Withdrawn) An apparatus for at least one of preliming sugar beet raw juice and for obtaining a non-sucrose substance concentrate which consists of a concentrated coagulate of non-sucrose substances made from sugar beet raw juice, said apparatus comprising at least one vessel for milk of lime treatment of the raw juice for coagulation of the non-sucrose substances present in the raw juice, said vessel having at least one inlet for the raw juice, at least one inlet for milk of lime and an outlet for discharge of the prelimed raw juice, at least one first removal apparatus for removing the coagulate slurry obtained in the preliming from the preliming juice, said first removal apparatus having an inlet, connected to the outlet of the vessel, for the preliming juice, a first outlet for discharge of the clear preliming juice removed from the coagulate slurry, and a second outlet for discharge of the coagulate slurry, and at least one second removal apparatus for further concentration of the coagulate slurry, said second removal apparatus having an inlet, connected to the second outlet of the first removal

apparatus, for the removed coagulate slurry, a first outlet for discharge of the removed clear preliming juice and a second outlet for discharge of the concentrated coagulate slurry, wherein the preliming juice conducted out of the first outlet of the first removal apparatus is combined with the preliming juice conducted out of the first outlet of the second removal apparatus in a common line.

46. (Withdrawn) The apparatus according to claim 45, wherein the first removal apparatus is a static or dynamic decanter or a centrifuge.

47. (Withdrawn) The apparatus according to claim 46, wherein the centrifuge is a pan centrifuge or a decanter centrifuge.

48. (Withdrawn) The apparatus according to claim 45, wherein the second removal apparatus comprises one or more membrane filter press(es) or at least one centrifuge or vacuum rotary filter.

49. (Withdrawn) The apparatus according to claim 48, wherein the centrifuge is a pan separator or a decanter centrifuge.